Section 7.2

Exercise 4. For which positive integers $n$ is the sum of divisors of $n$ odd?

Exercise 7. Show that if $k > 1$ is an integer, then the equation $\tau(n) = k$ has infinitely many solutions.

Exercise 10. Which positive integers have exactly four positive divisors?

Exercise 12. Show that the equation $\tau(n) = k$ has at most a finite number of solutions when $k$ is a positive integer.

Exercise 29. Show that a positive integer $n$ is composite if and only if $\tau(n) > n + \sqrt{n}$.

Section 7.3

Exercise 1. Find the six smallest even perfect numbers.

If $n$ is a positive integer, we say that $n$ is deficient if $\sigma(n) < 2n$, and we say that $n$ is abundant if $\sigma(n) > 2n$. Every integer is either deficient, perfect, or abundant.

Exercise 8. Show that any proper divisor of a deficient or perfect number is deficient.

Exercise 14. Show that if $n = p^aq^b$, where $p$ and $q$ are distinct odd primes and $a$ and $b$ are positive integers, then $n$ is deficient.